



Charlotte Mason's House of Education,
Scale How, Ambleside, UK, 2009

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EARLY ARITHMETIC.

BY L. H. ENSOR.

THE character of a foundation depends upon the character of the building which is to rest on it. The foundation of a cathedral may require the highest skill and years of patient work; all this would be wasted where the result is to be a summer house.

Similarly in commencing any study with the children we need to ask ourselves, "Where is the work beginning now to end?" in order that the foundation may bear the superstructure. Now all the higher mathematics rest upon the elementary processes of arithmetic, and often enough when a pupil reaches more advanced stages he is confronted by difficulties whose existence proves, like a rift in the wall, that the foundation is not sound, it has proved unequal to the strain put upon it.

It is therefore worth while to give careful and loving attention to the child's first notions of arithmetic. For it was in the higher walks of astronomical mathematics that Kepler (was it Kepler?) was thrilled by the discovery that he was "thinking God's thoughts after Him"; and the beginning contains the end in embryo. There is an organic connection between the two, and if our children thoroughly grasp the first principles of arithmetic, they are appreciably the better able to discern the working of the Divine mind in the ordering of the universe.

The following lessons are the outcome of the enthusiasm engendered by this belief. No trouble is too great which will make the child's first notions clear and true, containing in them the germ of the fully realised developments. The lessons lay no claim to originality. They are simply the outworking for the individual pupil of commonly accepted principles and methods, which in a general way influence all modern teaching. But modern teaching is essentially the teaching of classes, and the mind of a class is a slower-working, vaguer, less controllable entity than the mind of a child. Much more can be done for the child than for the class.

The principle on which the work is based is the following:—"The concrete being unknown, or imperfectly known, the abstract is marked by the same characteristics." The method

used in calculation is that known as "making up the decimal" (e.g. $25 + 8$. You want 5 to make 30, and the 3 make it 33). Principle and method are alike common property, except that our basis is the half-ten. The only new thing lies in the outworking. The result is that the little ones add and subtract with great readiness, learn readily to find products mentally up to 12×99 , without having ever heard of a multiplication table, and divide by any number up to say 49 easily by short division. Probably to divide by a higher number would be a strain upon the average small child; this extended short division is only used as a stepping-stone to the understanding of long division. These results are not mechanical; the concrete is perfectly known, and the abstract follows easily.

The apparatus required consists of *one-inch* pease-work sticks. There are needed a few hundreds loose; at least five hundred tied in tens; about a hundred more of these tens tied in bundles of ten (ten tens) and (terrible work) another bundle of ten hundreds, each hundred being composed of ten tied up tens. These tying-up processes can appropriately be performed at such times as one usually does fancy work. In addition about twelve bundles of a hundred will be required, and two or three bundles of a thousand showing the hundreds, but none of this lot need show the tens, and sticks can be got by the packet of ten bundles of a hundred (Philip & Sons). But they all need tying again very firmly. The rounded pointed sticks are the best—they are easier seen, and make prettier bundles. It would be well to have most of the loose sticks and some of the bundles of this sort. But the other sort is cheaper and will do for most of the bundles (9d. or 1s. the dozen hundreds). This supplies the concrete.

We begin with the loose sticks. We call them units. The child has the units arranged in long rows like palisades. The first step is to practise taking out twos *without counting*. The teacher takes out two sticks *together*, and shows them to the child who readily sees what is wanted. Thus the idea of two as a unity is implanted. I cannot too earnestly impress the fact that counting in these lessons is fatal. No counting must ever be allowed. (The children may as well learn to count at some other time, but *not* during the arithmetic lesson. They should count always in the ordinary way, six, seven,